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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,435	01/27/2004	Subhendu Guha	USS-18302/16	1518

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EXAMINER	
TRAN, THANH Y	

ART UNIT	PAPER NUMBER
2892	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,435	GUHA ET AL.	
	Examiner	Art Unit	
	THANH Y. TRAN	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-14 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-14 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid. Applicant's submission filed on 08/13/2009 has been entered.

Claim Objections

1. Claims 2-10 and 13-14 are objected to because of the following informalities: In claims 2-10 and 13-14, "The process" should be changed to: --The method-- because they are dependent upon a method claim 22. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 2-8, 11, 13-14 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Guha et al (U.S. 6,274,461) (of record).

As to claim 22, Guha et al teaches in figures 1-2 a method for the plasma deposition of a layer of a microcrystalline semiconductor material, said method comprising the steps of: providing a deposition chamber (see col. 6, lines 21-30); providing a process gas mixture which includes a precursor of a semiconductor material and a concentration of a diluent (col. 1, lines 23-35); disposing a substrate in the deposition chamber (it's inherent to dispose a substrate in the deposition chamber because the plasma deposition includes a layer of semiconductor material

onto a substrate, see col. 2, lines 43-61 and col. 6, lines 21-30); introducing the process gas into the deposition chamber (see col. 6, lines 21-30); energizing the process gas in the chamber with electromagnetic energy so as to create a plasma therefrom which decomposes at least some of the components of the process gas so as to deposit a layer of said semiconductor material onto the substrate (see col. 1, lines 23-35 and col. 2, lines 43-57); controlling at least one deposition parameter of said deposition process so that the layer of semiconductor material which is deposited onto the substrate in said deposition process is microcrystalline, said at least one parameter being selected from the group consisting of: the composition of the process gas; the pressure of the process gas; the power density of the electromagnetic energy; the frequency of the electromagnetic energy; and the temperature of the substrate (see col. 2, Lines 43-61); and varying the concentration of said diluent in said process gas as a function of the thickness of the layer of microcrystalline semiconductor material which has been deposited onto said substrate (col. 6, lines 20-53).

As to claim 2, Guha et al teaches in figures 1-2 a method, wherein the concentration of the diluent is decreased as the thickness of the layer increases (see col. 6, lines 48-53 and 62-67).

As to claim 3, Guha et al teaches in figures 1-2 a method, wherein the concentration of the diluent is varied in a stepwise manner as the thickness of said layer increases (see col. 6, lines 48-53).

As to claim 4, Guha et al teaches in figures 1-2 a method, wherein the concentration of the diluent is varied as a continuous function of the thickness of the layer (see col. 2, line 62 – col. 3, line 12).

As to claim 5, Guha et al teaches in figures 1-2 a method, wherein the microcrystalline semiconductor material includes a group IV element (see col. 5, lines 36-40).

As to claim 6, Guha et al teaches in figures 1-2 a method, wherein the process gas comprises a member selected from the group consisting of: SiH4, Si2H6, GeH4, SiF4, GeF4 or combinations thereof (see col. 8, lines 52-54).

As to claim 7, Guha et al teaches in figures 1-2 a method, wherein the diluent is selected from the group consisting of hydrogen, deuterium, a halogen or combinations thereof (see col. 8, lines 55-57).

As to claim 8, Guha et al teaches in figures 1-2 a method, wherein the diluent comprises hydrogen (see col. 8, lines 65-67).

As to claim 11, Guha et al teaches in figures 1-2 a method, wherein the step of varying the concentration of the diluent in the process gas comprises changing the amount of the diluent in the process gas (see col. 8, lines 61-64).

As to claim 13, Guha et al teaches in figures 1-2 a method including the further step of varying at least one of the deposition parameters as a function of the thickness of the layer of microcrystalline semiconductor material which has been deposited (see col. 2, lines 62-66 and col. 6, lines 20-53).

As to claim 14, Guha et al teaches in figures 1-2 a method, wherein the semiconductor material includes silicon and germanium therein and wherein the process gas includes a silicon-containing compound ("silicon to germanium"), a germanium-containing compound (see col. 2, line 62 – col. 3, line 7), and a diluent selected from the group consisting of hydrogen, deuterium or combinations thereof, and wherein the ratio of the silicon-containing compound to the

germanium-containing compound is varied while the semiconductor material is being deposited so that the silicon/germanium ratio of the layer of semiconductor material varies as a function of layer thickness (see col. 3, lines 7-12; and col. 9, line 4 – col. 10, line 10), and wherein the concentration of the diluent gas in the process gas is increased as the ratio of the germanium-containing compound to the silicon-containing compound therein increases (col. 2, line 62 – col. 3, line 12).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guha et al (U.S. 6,274,461) (of record) in view of Patil et al (U.S. 2003/0036090) (of record).

As to claims 9 and 10, Guha does not disclose the electromagnetic energy is microwave energy or radiofrequency energy.

Patil teaches the electromagnetic energy is microwave energy or radiofrequency energy (see paragraphs [0027] & [0028]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the process of Guha by using the electromagnetic energy which is microwave energy or radiofrequency energy for providing a specific range of frequency (see paragraphs [0027] & [0028] in Patil).

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guha et al (U.S. 6,274,461) (of record) in view of Maxwell et al (U.S. 5,786,023) (of record).

Guha does not disclose the step of varying the concentration of the diluent in the process gas comprises changing the amount of the semiconductor precursor in the process gas.

Maxwell teaches in col. 13, lines 63-67 a step of varying the concentration of the diluent in the process gas comprises changing the amount of the semiconductor precursor in the process gas. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the process of Guha by having the step of varying the concentration of the diluent in the process gas comprises changing the amount of the semiconductor precursor in the process gas as taught by Maxwell for providing a growth of the layer (thin film) or increasing layer thickness.

Response to Arguments

7. Applicant's arguments filed 3/14/06 have been fully considered but they are not persuasive.

Applicant argued that the patent No. US 6,274,461 teaches the method for deposition of amorphous semiconductor materials, and thus all claims at issue are directed to subject matter which is novel with regard to the '461 patent.

In response, the examiner disagrees with applicant's argument because the patent No. US 6,274,461 of Guha et al clearly teaches a method for the plasma deposition of a layer of semiconductor material, wherein the deposited semiconductor material is amorphous or microcrystalline (see col. 2, lines 43-66). The '461 patent not only teaches the method for deposition of amorphous semiconductor material but also the deposition of microcrystalline semiconductor material. Therefore, applicant's argument(s) have been considered but they are not persuasive.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH Y. TRAN whose telephone number is (571)272-2110. The examiner can normally be reached on M-F (9-6:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thao X Le/
Supervisory Patent Examiner, Art Unit 2892

/T. Y. T./
Examiner, Art Unit 2892